Remarks

Claims 1-18 are pending in the subject application. By this Amendment, Applicants have amended claims 1, 9, and 15, canceled claims 2 and 14, and added new claims 19-21. Applicants have also amended pages 6 and 10 of the subject specification to correct inadvertent typographical errors contained therein. Support for the new claims and the amendments to the claims can be found throughout the subject specification and in the claims as originally filed. Entry and consideration of the amendments presented herein is respectfully requested. Accordingly, claims 1, 3-13, and 15-21 are currently before the Examiner. Favorable consideration of the pending claims is respectfully requested.

As an initial matter, Applicants note that the draftsperson has objected to the drawings as filed with the subject application. Applicants have submitted with this Amendment formal Figures 1A-B, 2A-B, and 3A-B in response to the Notice of Draftsperson's Patent Drawing Review. Accordingly, reconsideration and withdrawal of the objection is respectfully requested.

Claims 1-14 are rejected under 35 USC §112, first paragraph, as nonenabled by the subject specification. The Examiner states that while the subject specification does enable the expression of known Rep proteins in certain plant species, it does not enable methods for providing resistance to infection by a plant virus by means of expression of any and all Rep proteins, or fragments or variants thereof, in any species of plant. In particular, the Examiner indicates that "fragments" and "variants" of a Rep protein are not enabled because of the high level of unpredictability in the art for determining functional activity of fragments and variants of a protein. The Examiner also appears to assert that the claims are not enabled for proteins that have sequence homology with a Rep protein.

Applicants respectfully assert that the claims are enabled by the subject specification. The ordinarily skilled artisan, having the benefit of the teachings of the subject application, and without resort to undue experimentation can readily prepare and test polynucleotides that encode fragments of a Rep protein using standard techniques known in the art. Applicants respectfully submit that while some experimentation may be necessary, it is not controlling on the issue of undue experimentation. *Ex parte Jackson*, 217 USPQ 804, 807 (Bd. Pat. App. & Int. 1982) ("The test [for undue experimentation] is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine . . .") (emphasis added). Applicants respectfully assert that the

same is true for variants of a Rep protein. However, in a sincere effort to expedite prosecution of the subject application to completion, Applicants have amended claims 1, 9, and 15 to delete reference to "variant." Applicants have also amended the claims to specify that resistance is to a geminivirus and that the Rep protein is not mutated. Accordingly, reconsideration and withdrawal of the rejection under 35 USC §112, first paragraph, is respectfully requested.

Claims 1-3, 5, 6, 9, 10, 12, 15, 17, and 18 are rejected under 35 USC §102(b) as anticipated by Brunetti *et al.* (1997). The Examiner asserts that the Brunetti *et al.* reference teaches expression of a truncated viral Rep protein in tomatoes which confers resistance to tomato yellow leaf curl virus. Applicants respectfully traverse.

Applicants note that the transformed plants described in the Brunetti *et al.* reference have a phenotype that is significantly altered from non-transformed plants. At page 573, top of column 2, of the Brunetti *et al.* reference, the authors indicate that "the [virus] resistant transgenic plants developed curled leaves and produced sterile flowers (Fig. 4A) . . .." This altered phenotype of the virus resistant plants described in the cited reference makes them essentially useless on a commercial level. If the transgenic plants have sterile flowers, then they will be unable to be pollinated and bear fruit. In contrast, the plants produced using Applicants' claimed methods exhibit substantially the same phenotype of non-transformed plants. For example, at page 10, lines 18-20, and page 11, lines 7-9, and Tables 3, 4, and 6 of the subject specification, it is taught that Applicants' transgenic plants had a yield that was substantially the same or greater than non-transformed plants. By this Amendment, Applicants have amended the claims to recite that the virus resistant plants of their invention have substantially the same phenotype as non-transformed plants. Accordingly, reconsideration and withdrawal of the rejection under 35 USC §102(b) is respectfully requested.

Claims 1-4, 6, 9-11, 15, 16, and 18 are rejected under 35 USC §102(b) as anticipated by Stout *et al.* (1997). Claims 1-4, 6-11, 15, 16, and 18 are rejected under 35 USC §102(e) as anticipated by Stout *et al.* (U.S. Patent No. 6,291,743). The Examiner asserts that the Stout *et al.* references teach expression of a *Rep* gene in tomatoes which confers resistance to tomato mottle virus and TYLCV. Applicants respectfully traverse each grounds of rejection and assert that the cited references do not anticipate the claimed invention.

In regard to the Stout *et al.* abstract, Applicants respectfully assert that the cited reference does not teach or suggest virus resistant plants that express a non-mutated Rep protein. In lines 9-10 of the Stout *et al.* abstract, the authors indicate that "lines with sense and antisense *rep* constructs showed little, if any, delay in symptom development, ..." Thus, the plants described in the Stout *et al.* abstract that expressed a non-mutated *rep* gene did not exhibit resistance to viral infection.

In regard to the rejection over the Stout *et al.* patent, Applicants respectfully assert that the results disclosed therein regarding resistance of the transgenic plants to virus are not particularly meaningful and do not establish that virus resistant plants were obtained. For example, in the Stout *et al.* patent, resistance is not demonstrated for the entire life of the plant, but only for 32 days (See Table 11 of Stout *et al.*). In addition, the constructs described in the Stout *et al.* patent for producing virus resistant transgenic plants encoded a mutated viral Rep protein. As noted in regard to the rejection under 35 USC §112, first paragraph, Applicants have amended the claims to specify that the Rep protein used in the invention is not mutated. Accordingly, reconsideration and withdrawal of both rejections under 35 USC §102 based on the Stout *et al.* references is respectfully requested.

It should be understood that these amendments have been made solely to expedite prosecution of the subject application to completion and should not be construed as an indication of Applicants' agreement with or acquiescence in the Examiner's position.

In view of the foregoing remarks and amendments to the claims, Applicants believe that the currently pending claims are in condition for allowance, and such action is respectfully requested.

The Commissioner is hereby authorized to charge any fees under 37 CFR §§1.16 or 1.17 as required by this paper to Deposit Account No. 19-0065.

Applicants invite the Examiner to call the undersigned if clarification is needed on any of this response, or if the Examiner believes a telephonic interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

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DRP/sl
Attachments: Marked-Up Version of Substituted Paragraphs; Marked-Up Version of Amended Claims; Figures 1A-B, 2A-B, and 3A-B.

Marked-Up Version of Substituted Paragraphs

Paragraph on page 6, beginning at line 14:

The subject invention also concerns recombinant polynucleotide molecules comprising a vector in which a polynucleotide sequence encoding a plant virus Rep protein, or a mutant thereof, which is expressible in a suitable host plant has been inserted. Suitable vectors may be selected from those known in the art including plasmids, phage DNA, or derivatives or fragments thereof, or combinations of plasmids and phage DNA, and yeast plasmids. The polynucleotide encoding the Rep protein can be inserted into the multiple cloning site of a vector, such as the commercially available pUC vectors or the pGEM vectors, which allow for the excision of the polynucleotide having restriction termini adapted for insertion into any desirable plant expression or integration vector. In addition, regulatory sequences such as promoters can be operatively linked to the coding sequences of the [polynuceotides] polynucleotides of the present invention. For example, the 35S promoter of cauliflower mosaic viruses (CaMV) can be used with the subject invention. Other plant expression vectors can also be used in the present invention.

Paragraph on page 10, beginning at line 11:

Infection rates as determined by viral nucleic acid detection, were much lower in all transformed lines than in untransformed lines. Transformed lines [has] have high levels of tolerance, which were overcome only with high populations of viruliferous whiteflies. Figures 1A, 2A, and 3A show the disease progress curves from untransformed and transformed lines from trials over three seasons. The highest rates of infection were observed in the Fall 1998 season (Figures 3A and 3B) which had extremely high populations of viruliferous whiteflies (at 100 per 10 terminal leaflets).

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Marked-Up Version of Amended Claims

Claim 1 (amended):

1. A method for providing resistance to infection by a geminivirus plant virus in a plant or plant tissue, said method comprising transforming said plant or plant tissue with a polynucleotide that encodes a non-mutated Rep protein, or a fragment [or variant] thereof, of said plant virus that is expressed in said transformed plant or plant tissue, wherein the phenotype of said transformed plant or plant tissue is substantially the same as a non-transformed plant or plant tissue.

Claim 9 (amended):

9. A transgenic plant or plant tissue having increased resistance to infection by a geminivirus plant virus, wherein said plant or plant tissue comprises a polynucleotide [sequence] that encodes a non-mutated [plant virus] Rep protein, or a fragment [or variant] thereof, of said plant virus that is expressed in said transgenic plant or plant tissue, wherein the phenotype of said transgenic plant or plant tissue is substantially the same as a non-transgenic plant or plant tissue.

Claim 15 (amended):

15. A cell transformed with a polynucleotide [sequence] that encodes a [plant virus] geminivirus Rep protein, or a fragment [or variant] thereof.